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PERFORMANCE STANDARD VERIFICATION PLAN

AMERICAN CHEMICAL SERVICE SUPERFUND SITE
GRIFFITH, INDIANA

Montgomery Watson File No. 1252042

Prepared For:
ACS RD/RA Executive Committee

Prepared By:
Montgomery Watson
Addison, Illinois 60101

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MONTGOMERY WATSON

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APPENDICES

Appendix A Air Permit Equivalency

1.0 INTRODUCTION

This Performance Standard Verification Plan (PSVP) has been prepared in conjunction with the 95% Remedial Design Report for the American Chemical Service, Inc. (ACS) NPL Site in Griffith, Indiana (Site). This PSVP addresses monitoring activities that will be conducted to verify compliance with performance standards established in the Statement of Work (SOW) for Remedial Design and Remedial Action at the Site. The remedial action objectives established in the Record of Decision (ROD) and the amended ROD for the Site are:

1. Minimize exposure to contaminated soil, groundwater, buried drums/liquid wastes/sludges or other substances which would result in a risk greater than the acceptable risk range identified in the ROD and amended ROD;

2. Restore groundwater to applicable state and federal requirements;

3. Reduce migration of contaminants off-site through water, soil or other media; and

4. Reduce the potential for erosion and possible migration of contaminants via Site surface water and sediments.

The Remedy has the following elements: 1) source (mass) reduction, 2) treatment of process wastes, and 3) containment of wastes. These elements will serve to eliminate contaminant migration from source areas and reduce potential human exposure to acceptable levels. The Remedy consists of:

- *In-situ* soil vapor extraction (ISVE) in the Still Bottoms Pond Area (SBPA) *(source reduction and prevention of vapor migration)*;

- ISVE in the areas of volatile organic compound (VOC) impact in the Off-Site Containment Area (OFCA) *(source reduction and prevention of vapor migration)*;

- ISVE in the Kapica-Pazmey Area (KP) *(source reduction and prevention of vapor migration)*;

- Treatment of extracted vapor *(vapor control)*; and

- Installation of an engineered cover over the areas containing buried waste *(containment and prevention of direct contact with impacted soil and vapors).*

In addition, the expedited remedial actions that currently contain the source areas and groundwater, including the Perimeter Groundwater Containment System (PGCS), Barrier Wall Extraction System (BWES), and barrier wall, will continue to operate as part of the Remedy. The following items will be conducted or continued in accordance with the ROD and the amended ROD:

- Removal of the PCB-impacted sediments in the wetlands area by excavating and disposing sediments off-site at a Toxic Substances Control Act (TSCA)-approved landfill or consolidating them at locations inside the barrier wall depending on contaminant concentrations, and in accordance with the PCB-Impacted Soil Excavation Work Plan;

- Removal and off-site disposal of the intact drums in the On-Site Containment Area in accordance with the Agency-approved Buried Drum Removal Plan;

- Continued groundwater pumping from the PGCS and BWES and treatment through the groundwater treatment plant in accordance with the PSVP for the groundwater treatment system;

- Active treatment and Monitored Natural Attenuation (MNA) for groundwater outside the barrier wall in North and South/Southeast areas;

- Long term groundwater monitoring, in accordance with the Agency-approved groundwater monitoring program; and

- Private well sampling, in accordance with the Agency-approved groundwater monitoring program.

Because performance guidelines have already been established for the above-listed remedial actions, this PSVP only pertains to the engineered cover, ISVE system, and the dewatering system associated with the implementation of the ISVE system.

Supporting workplans, including the May1999 Quality Assurance Project Plan (QAPP), the May 1999 Field Sampling Plan (FSP), June 1999 FSP Addendum, and June 1999 Site Safety Plan (SSP) Addendum have been developed and submitted or will be submitted under separate cover to the United States Environmental Protection Agency (U.S. EPA).

2.0 APPLICABLE PERFORMANCE STANDARDS

2.1 ENGINEERED COVER

Because covering was not a part of the original ROD, the requirements for covering at the ACS Site are not outlined in the SOW. Therefore, several regulatory references were used in the evaluation of various alternatives for the cover (1, 2). An evaluation of conventional and alternative designs was conducted to determine an appropriate covering remedy design. Both Federal (U.S. EPA Subtitle D) and Indiana Department of Environmental Management (IDEM - Municipal and Hazardous Waste Landfills) regulations were used to provide potential design criteria for the evaluation. These regulations are particular to solid and hazardous waste landfills, and therefore are not applicable to the ACS Site. Therefore, the following are design objectives of the cover system:

- Eliminate potential direct contact with VOC- and PCB-contaminated soils (and lead-contaminated soils in the Kapica-Pazmey Area);
- Eliminate potential worker contact with VOC-contaminated groundwater;
- Reduce the potential for contaminant migration to groundwater by reducing infiltration to these areas; and
- Provide a surface seal for the ISVE system, to minimize potential short-circuiting and maximize the capture of VOC vapors.

To ensure the engineered covers are constructed such that they meet the design objectives, the procedures in the June 1999 Construction Quality Assurance Plan (CQAP) will be implemented. Following final inspection, in order to assess performance, the following will be implemented:

- Monitoring of vacuums and flows through the ISVE system to ensure cover integrity (if cover is intact, short circuiting of atmospheric air into the ISVE system will be minimized);
- Monitoring of water levels in wells and piezometers within cover boundaries (if cover is intact, little recharge to groundwater should occur and, therefore, water levels should decrease over time with continued BWES pumping); and
- Quarterly and storm event inspections to ensure cracking or erosion of covers is detected and scheduled for repair.

2.2 ISVE SYSTEM

ISVE is consistent with the objectives of the final remedy for the ACS Site, as defined in the ROD and the amended ROD, to address principle threats by reducing the risk of exposure to contaminated vapors and reducing the potential migration of mobile contaminants to the groundwater. Off-gas samples will be collected during system operation to verify that system air discharge is in compliance with the IDEM Air Permit Equivalency requirements (to be inserted in Appendix A once received from IDEM).

In addition, because of the complexity of the Site and the need to optimize the Site remedial systems, it will be necessary to monitor ISVE system performance. The following parameters will be measured to monitor the performance of the ISVE system:

- Atmospheric conditions (temperature, relative humidity, atmospheric pressure, general weather conditions);
- Vapor flow rate;
- Vacuum;
- Vapor temperature;
- Natural gas consumption rate; and
- ISVE extraction well water levels.

2.3 DEWATERING SYSTEM

In accordance with the 95% RD, one remedial design objective is to contain and treat the groundwater plume. Currently, the barrier wall contains the groundwater plume while the BWES extracts and conveys the impacted groundwater to the groundwater treatment plant. The BWES upgrades installed during RA construction will lower the water table within the ISVE areas, exposing the majority of the soil contamination that is currently below the water table. Once the zone of contamination is exposed, the ISVE system will withdraw contaminated vapors from the subsurface for treatment. The following parameters will be measured to monitor the performance of the dewatering system:

- Water level measurements; and
- Flowrate from extraction trenches and wells.

3.0 ENGINEERED COVER

Construction of the final SBPA asphalt cover will include an alternative high-strength, low permeability asphalt cover mixture, which will provide the necessary low-permeability layer while still allowing for the operation of the ACS facility including loaded semi-tractor access, parking, and other non-intrusive activities. The OFCA cover will utilize existing topographic features and a previously installed interim clay cap to provide a low permeability engineered cover and allow sheet flow to drain off the cover in an efficient, controlled manner. In order to achieve the design objectives stated in Section 2.1, it is necessary to monitor both the construction and operation phases of the engineered cover.

3.1 CONSTRUCTION REQUIREMENTS

In accordance with the June 1999 CQAP and the 95% RD, the engineered covers at the ACS Site will be constructed of (in ascending order):

- On-Site: 12-inches clay compacted in 6-inch lifts, a geotextile liner, 6- to 8-inches of gravel, and 4-inches total of a modified asphalt binder and asphalt surface course.

- Off-Site: 12-inches of compacted clay in 6-inch lifts, a 60-mil very flexible polyethylene (VFPE) flexible membrane liner (FML), and an 18-inch earthen layer, where the upper 6-inches is composed of topsoil and planted with a shallow-rooted blend of native vegetation.

Specific design criteria, such as the grading plan, layer thickness, cover material composition, compaction, and survey control, will be strictly enforced to document that the engineered covers were constructed to meet the design objectives.

3.2 OPERATIONAL REQUIREMENTS

Once all of the construction requirements have been met, performance monitoring of the engineered covers may commence. In accordance with the design objectives, performance monitoring will consist of:

- Monitoring of vacuums and flows through the ISVE system to ensure engineered cover integrity (detailed in Section 4.1 of this PSVP);

- Monitoring of water levels in wells and piezometers within cover boundaries (detailed in Section 5.0 of this PSVP); and

- Quarterly and storm event inspections to ensure cracking or erosion of the engineered covers are detected and scheduled for repair (to be detailed in the Operations and Maintenance (O&M) Manual).

4.0 ISVE SYSTEM

The main objective of ISVE at the ACS Site is VOC reduction in source areas by extracting mobile VOCs, and, to some extent, semivolatile organic compounds (SVOCs) from below the ground surface. ISVE systems were designed to treat the three source areas, the SBPA, OFCA, and KP Area, as identified in the 95% RD. The extracted vapor from these systems is conveyed to an off-gas treatment system, located in the groundwater treatment plant, prior to atmospheric release. The following section details off-gas monitoring activities during the ISVE operational phase.

4.1 SYSTEM MONITORING

Compliance monitoring of the ISVE system will be necessary to determine if off-gas emissions generated are allowable under the IDEM Air Permit Equivalency (Appendix A). Compliance monitoring will consist of:

- Sampling and analyzing the blower outlet and outlet vapor of the extracted vapor treatment system, when applicable, to determine if emissions are in compliance with IDEM regulations and to determine the overall destruction capacity of the catalytic oxidation units.

Performance monitoring will be conducted to evaluate and optimize the ISVE systems in the SBPA, and the OFCA and KP Areas. Performance monitoring will consist of:

- Site conditions, such as temperature, relative humidity, atmospheric pressure and general weather conditions recorded on a regular basis to aid in determining factors that affect overall system performance;
- Gas flow rates at the individual ISVE wells, headers, catalytic oxidation units, and the discharge stack, as necessary to ensure the system is operating as intended;
- Vacuum at the individual ISVE wells, headers, blowers, and silencers, as necessary to evaluate capture of vapors;
- Gas temperature before and after the ISVE blowers;
- Natural gas consumption of the catalytic oxidation unit; and
- ISVE well water levels to determine: 1) if free product is present in the wells and its recoverability and 2) if the dewatering level is being maintained.

Matrices of the ISVE system monitoring parameters and schedules may be found in Table 4-1 through Table 4-4. The ISVE schedules include:

- Table 4-1: Initial system startup (first time system is operational);
- Table 4-2: Startup (applies to first month after initial system startup only);
- Table 4-3: Post-startup (applies to monitoring after startup period has been completed); and
- Table 4-4: New well startup periods (applies to each time a new well or group of wells are brought on-line).

Either continuous or cycled operation of the ISVE system will continue in the OFCA, KP, and SBPA Areas until the respective removal rate has been reduced to 100 pounds per day or less. Following active ISVE system operation, the ISVE extraction wells will be opened and allowed to vent to atmosphere, and the ISVE wells will function as long-term air vents system. This long-term venting system will allow and maintain a level of biological degradation in the subsurface that will continue to reduce the non-mobile contaminants within the containment system. During long-term venting, ISVE monitoring, as described in Table 4-1 through Table 4-4, will cease.

5.0 DEWATERING SYSTEM

The purpose of the extraction trenches and dual-phase extraction wells is to dewater the upper aquifer in the vicinity of the ISVE systems in the Still Bottoms Pond Area, the Off-Site Containment Area, and the Kapica-Pazmey Area to allow the majority of the contamination to be exposed for ISVE treatment. Lowering the water table will expose the majority of the soil contamination that is currently below the water table to the vacuum imposed by the ISVE blowers. Once the zone of contamination is exposed, the ISVE system will withdraw contaminated vapors from the subsurface for treatment. Exposing the soil will increase the effectiveness of ISVE systems by exposing the areas with the largest volumes of contaminants.

In order to gauge the effectiveness of the dewatering efforts, periodic water level measurements will be conducted on one-third of the ISVE wells in accordance with Table 4-1 through Table 4-4 of this PSVP. The wells were considered representative based on their location within their respective ISVE systems (Figures 1 through 3).

Area	**Water Level Gauging Points**
Kapica-Pazmey Area	SVE-1 SVE-4 SVE-8 SVE-10
Off-Site Containment Area	SVE-13 SVE-15 SVE-18 SVE-20 SVE-24 SVE-29 SVE-31 SVE-34 SVE-37 SVE-40
Still Bottoms Pond Area	SVE-44 SVE-46 SVE-49 SVE-53 SVE-56 SVE-59 SVE-62 SVE-65 SVE-69 SVE-72 SVE-73 SVE-77 SVE-79 SVE-82 SVE-86

In addition, existing BWES monitoring points will continue to be measured to confirm a hydraulic capture zone within the barrier wall is maintained.

Monitoring Location	**Water Level Gauging Points**
BWES Paired Piezometers	P93/P94 P95/P96 P97/P98 P99/P100 P101/P102 P103/P104 P105/P106 P107/P108
Additional Monitoring Points	P3 P32 P49 P96

The water level data will be used to generate upper aquifer groundwater contour maps for evaluating the capture zone of the extraction trenches and dual phase extraction wells. In addition to water level measurements, the flowrate of groundwater extracted from the operational trenches and extraction wells will be monitored to assess the performance of the dewatering system.

6.0 QUALITY ASSURANCE/QUALITY CONTROL

6.1 FIELD PROCEDURES

Chain of custody and field logbook/documentation and sample handling, packaging, and shipment procedures will be as outline in Section 5 of the May 1999 QAPP and June 1999 Field Sampling Plan (FSP) Addendum, respectively.

6.2 ANALYTICAL PROCEDURES

Analysis of air samples will be conducted following EPA-accepted procedures and protocols for organic analyses by a laboratory certified under the Contract Laboratory Program (CLP). The applicable methods and reporting limits are listed in Tables 7.1 and 3.1 of the May 1999 QAPP, respectively.

6.3 QUALITY CONTROL

Quality control samples will be collected and analyzed to evaluate the laboratory data and the sampling procedures. The potential introduction of detectable contamination during laboratory procedures can be evaluated by comparing the field quality control (QC) sample results with laboratory blank samples. Field duplicates will be utilized to evaluate the precision of laboratory analysis by comparing the results of two samples taken from the same source during the same time interval. The homogeneity of the sample matrix and the potential for differences in analytical results to be caused by sampling procedures will also be evaluated when assessing duplicate samples. The QC samples will be analyzed for the same constituents as the corresponding gas samples, using the same methods.

6.4 FIELD QUALITY CONTROL

Field duplicates will be collected and analyzed as described in Table 2.1 of the June 1999 FSP Addendum.

6.5 LABORATORY QUALITY CONTROL

The internal quality control procedures for CLP laboratories are specified in the applicable SOWs. These specifications include the types of QC checks required, compounds and concentrations to be used, and the quality control acceptance criteria for these audits.

The laboratory used for the analysis of samples will have a written QA/QC program as detailed in Section 8.0 of the May 1999 QAPP that will provide rules and guidelines to the reliability and validity of work conducted at the laboratory. Internal quality control procedures for analytical services will be conducted in accordance with their standard operating procedures (SOPs) and the individual method requirements in a manner consistent with appropriate SOWs and SOPs.

Where appropriate, internal quality control checks will include method blanks, preparation/reagent blanks, calibration check samples, surrogates, laboratory duplicates matrix spikes, and continuing calibration standards. The types and frequency of each audit, the compounds to be used for sample and surrogate spikes, and the quality control acceptance criteria for these audits are summarized within the SOWs and SOPs.

The laboratory will document, in each data package provided that both initial and ongoing instrument and analytical QC functions have been met. The laboratory will reanalyze any samples analyzed in nonconformance with the QC criteria if sufficient sample volume is available. It is expected that sufficient volume of samples will be collected for reanalysis.

7.0 REFERENCES

1. The July 1989 RCRA Technical Guidance Document: Final Covers on Hazardous Waste Landfills and Surface Impoundments (PB89-233480)

2. RCRA covers and final covers for municipal solid waste landfills are described In 40 CFR 264 Subpart G and 329 Indiana Administrative Code (IAC) 10-22-7

3. Montgomery Watson, 1999. *Quality Assurance Project Plan American Chemical Service Superfund Site Griffith, Indiana.*

4. Montgomery Watson, 1999. *Remedial Design/Remedial Action Field Sampling Plan American Chemical Service Superfund Site Griffith, Indiana.*

5. Montgomery Watson, 1999. *Field Sampling Plan Addendum American Chemical Service NPL Site Griffith, Indiana.*

6. Montgomery Watson, 1999. *Site Safety Plan Addendum American Chemical Service NPL Site Griffith, Indiana.*

7. Montgomery Watson, 1999. *PCB-Impacted Soils Excavation Work Plan American Chemical Service NPL Site Griffith, Indiana.*

8. Montgomery Watson, 1999. *Construction Quality Assurance Plan American Chemical Service NPL Site Griffith, Indiana.*

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Table 4-1
ISVE System Monitoring Schedule - Initial System Startup
American Chemical Service, Inc. NPL Site
Griffith, Indiana

Parameter	Initial System Startup
Flowrate	
Well	X
Header	X
Catalytic Oxidation Unit	X
Vacuum	
Well	X
Blower	X
Temperature	
Pre-Blower	X
Post-Blower	X
Pressure	
Blower/Silencer Discharge	X
Atmospheric Conditions	
Temperature	X
Relative Humidity	X
Atmospheric Pressure	X
General Weather Conditions	X
Soil Vapor Sampling	
Well - FID	X
Header - FID	X
Header - Lab Analysis	X
Off-Gas Sampling	
Startup	X
ISVE Well Water Levels	
Prior to System Startup	X

NOTES:
1. FID = Flame Ionization Detector

Table 4-2
ISVE System Monitoring Schedule - Start-up
American Chemical Service, Inc. NPL Site
Griffith, Indiana

Parameter	Daily	Weekly
Flowrate		
Well	X	X
Header	X	X
Catalytic Oxidation Unit	X	X
Vacuum		
Well	X	X
Blower	X	X
Temperature		
Pre-Blower	X	X
Post-Blower	X	X
Pressure		
Blower/Silencer Discharge	X	X
Catalytic Oxidation Unit		
Natural Gas Consumption	X	X
Atmospheric Conditions		
Temperature	X	X
Relative Humidity	X	X
Atmospheric Pressure	X	X
General Weather Conditions	X	X
Off-Gas Sampling		
Startup		X
Soil Vapor Sampling		
Well - FID		X
Header - FID		X
Header - Lab Analysis		X
ISVE Well Water Levels		
Startup		X

NOTES:
1. Startup applies to first month of operation only.
2. Daily measurement for the first week of operation only.
3. Weekly measurement for four weeks only (one month).
4. FID = Flame Ionization Detector

Table 4-3
ISVE System Monitoring Schedule - Post-Startup
American Chemical Service, Inc. NPL Site
Griffith, Indiana

Parameter	Daily	Weekly	Monthly	Quarterly
Flowrate				
Individual Headers				X
Header			X	
Catalytic Oxidation Unit			X	
Vacuum				
Well				X
Blower Inlet			X	
Temperature				
Pre-Blower			X	
Post-Blower			X	
Pressure				
Blower/Silencer Discharge			X	
Catalytic Oxidation Unit				
Natural Gas Consumption			X	
Atmospheric Conditions				
Temperature				X
Relative Humidity				X
Atmospheric Pressure				X
General Weather Conditions				X
Soil Vapor Sampling				
Well - FID				X
Header - FID			X	
Header - Lab Analysis				X
Off-Gas Sampling				
Compliance			(3)	
ISVE Well Water Levels				
Water Level Measurements				X

NOTES:

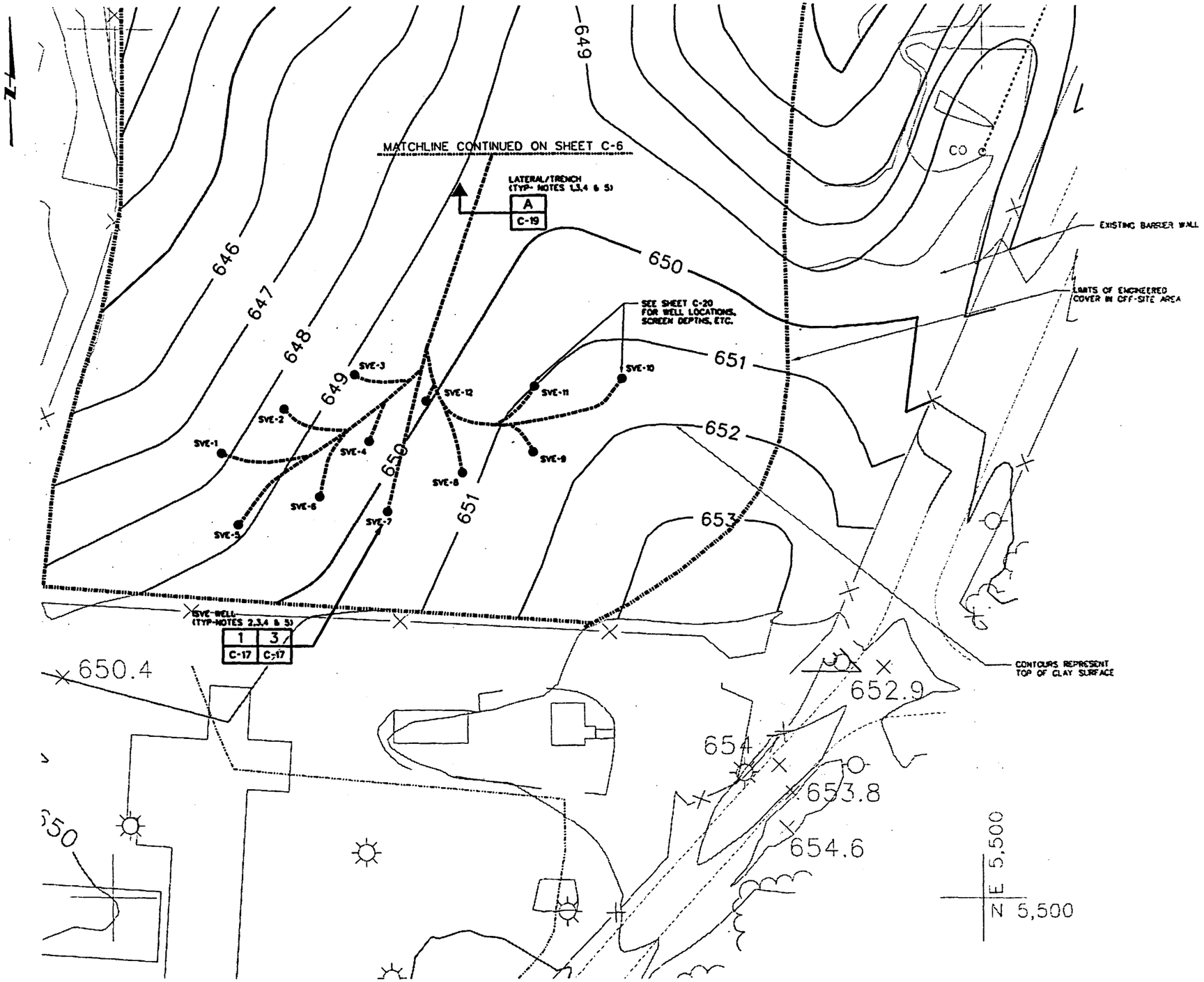
1. Post-startup operation occurs after one month of system operation.
2. FID = Flame Ionization Detector
3. Off-gas sampling will be in accordance with the Air Permit Equivalency.

Table 4-4
ISVE System Monitoring Schedule - New Well Startup
American Chemical Service, Inc. NPL Site
Griffith, Indiana

Parameter	Initial Startup	Daily	Weekly	End of Month
Flowrate				
Well	X		X	
Header	X		X	
Catalytic Oxidation Unit	X		X	
Vacuum				
Well	X		X	
Blower	X		X	
Soil Vapor Sampling				
Well - FID	X		X	
Header - FID	X		X	
Header - Lab Analysis	X		X	
ISVE Well Water Levels				
Water Level Measurements	X			X

NOTES:

1. Each time a new well or group of wells are brought on-line, the frequency of measurement for the above parameters should be increased for one month. After this startup monitoring, the post-startup schedule should be implemented.
2. FID = Flame Ionization Detector



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BURIED LATERAL ISVE PIPE ALIGNMENT

SVE-10 ● WELL LOCATION

DELINEATION OF OFF-SITE ENGINEERED COVER

NOTES:

1. ACTUAL PIPE LAYOUT AND WELL LOCATIONS TO BE FIELD MODIFIED AS NECESSARY AND APPROVED BY ENGINEER.
2. FOR WELL LOCATIONS, SEE SHEET C-20.
3. ISVE PIPING AND WELLS, AIR SPARGE PIPING, AND SPARGE POINTS TO BE INSTALLED THROUGH CLAY LAYER. PIPING TO SIT AT BOTTOM OF CLAY.
4. ACTUAL WELL AND PIPE LOCATIONS TO BE SURVEYED PRIOR TO TRENCH BACKFILL.
5. CLAY SURFACE AND EROSION CONTROL MEASURES TO BE REPAIRED AND RECOMPACTED FOLLOWING PIPE AND WELL INSTALLATION.
6. AFTER INSTALLATION OF THE ISVE IN THE KAPICA-PAZMEY AREA, THE SYSTEM WILL BE STARTED-UP AND OPERATED IN PHASES. SEE TEXT FOR DESCRIPTION OF PHASED START-UP AND OPERATION.

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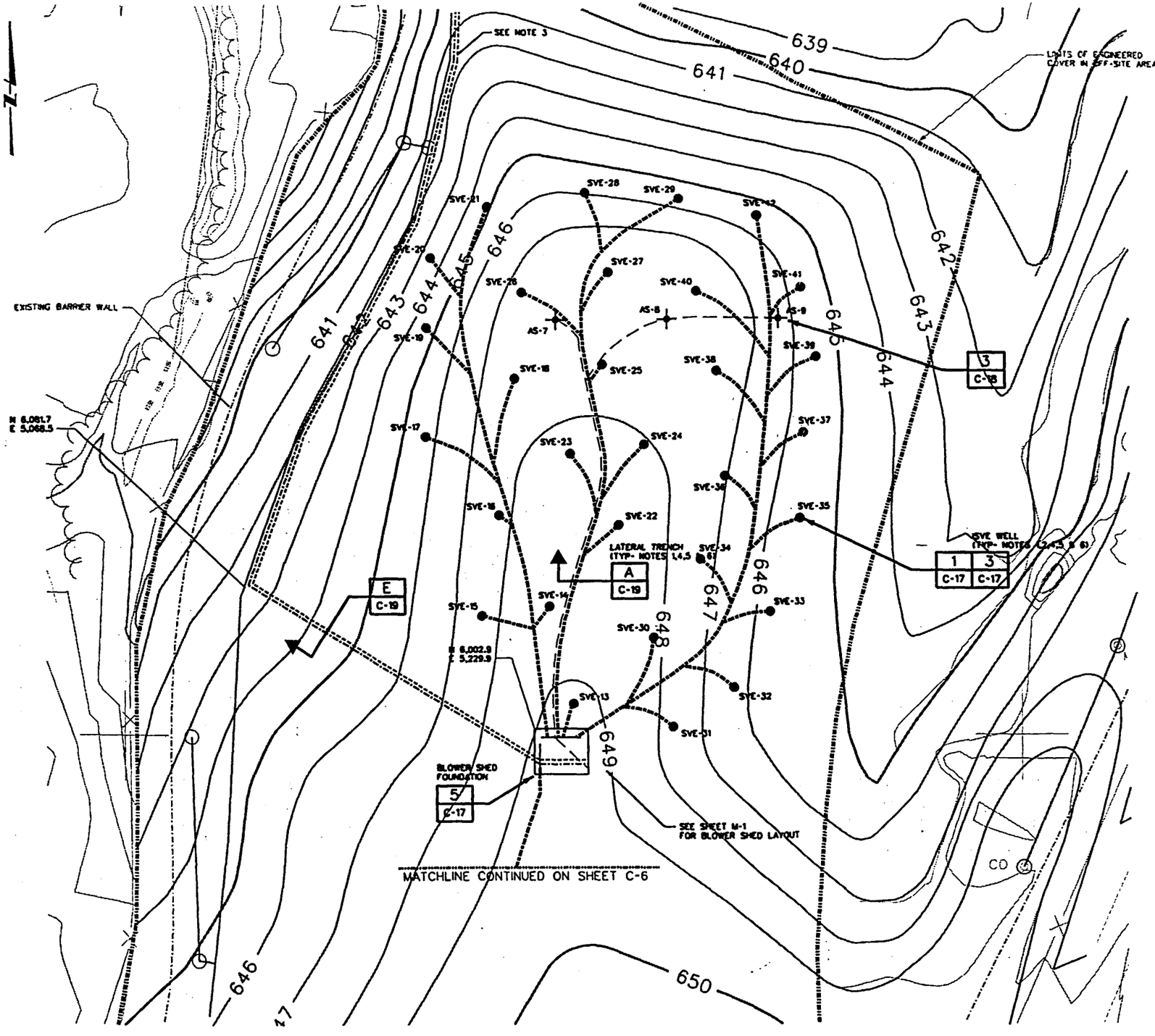
MONTGOMERY WATSON
Chicago, Illinois

ACS RD/RA GROUP
AMERICAN CHEMICAL SERVICE SUPERFUND SITE
GRIFFITH, INDIANA

95% REMEDIAL DESIGN
KAPICA-PAZMEY AREA
ISVE PLAN VIEW AND YARD PIPING

SHEET 1



LEGEND:

- —640— TOP OF CLAY CONTOUR ELEVATION
- VAPOR EXTRACTION PIPE ALIGNMENT
- AIR SPARGE SUPPLY PIPE ALIGNMENT
- SVE-42 WELL LOCATION
- AS-1 AIR SPARGE POINT
- ISVE VAPOR EFFLUENT CONVEYANCE PIPE
- CONDENSATE CONVEYANCE PIPE
- DELINEATION OF OFCA ENGINEERED COVER
- CONTAINMENT BARRIER WALL

NOTES:

1. ACTUAL PIPE LAYOUT AND WELL LOCATIONS TO BE FIELD MODIFIED AS NECESSARY AND APPROVED BY ENGINEER.
2. FOR WELL LOCATIONS, SEE SHEET C-20.
3. RUN ISVE AND CONDENSATE CONVEYANCE PIPE IN SAME TRENCH AS GROUNDWATER CONVEYANCE PIPE.
4. ACTUAL WELL AND PIPE LOCATIONS TO BE SURVEYED PRIOR TO TRENCH BACKFILL.
5. ISVE PIPING AND WELLS AND AIR SPARGE PIPING, AND SPARGE POINTS TO BE INSTALLED THROUGH CLAY LAYER. PIPING INVERT TO SIT AT BOTTOM OF CLAY.
6. CLAY SURFACE AND EROSION CONTROL MEASURES TO BE REPAIRED AND RECOMPACTED FOLLOWING PIPE AND WELL INSTALLATION.
7. AFTER INSTALLATION OF THE ISVE IN THE OFF-SITE CONTAINMENT AREA, THE SYSTEM WILL BE STARTED-UP AND OPERATED IN PHASES. SEE TEXT FOR DESCRIPTION OF PHASED START-UP AND OPERATION.

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TOM BLAIR (PROJECT MANAGER) IN-19600482 LICENSE NO. DATE
(COMPANY OFFICER) LICENSE NO. DATE

MONTGOMERY WATSON
Chicago, Illinois

ACS RD/RA GROUP
AMERICAN CHEMICAL SERVICE SUPERFUND SITE
GRIFFITH, INDIANA

95% REMEDIAL DESIGN

OFF-SITE CONTAINMENT AREA
ISVE PLAN VIEW AND YARD PIPING

SHEET 2

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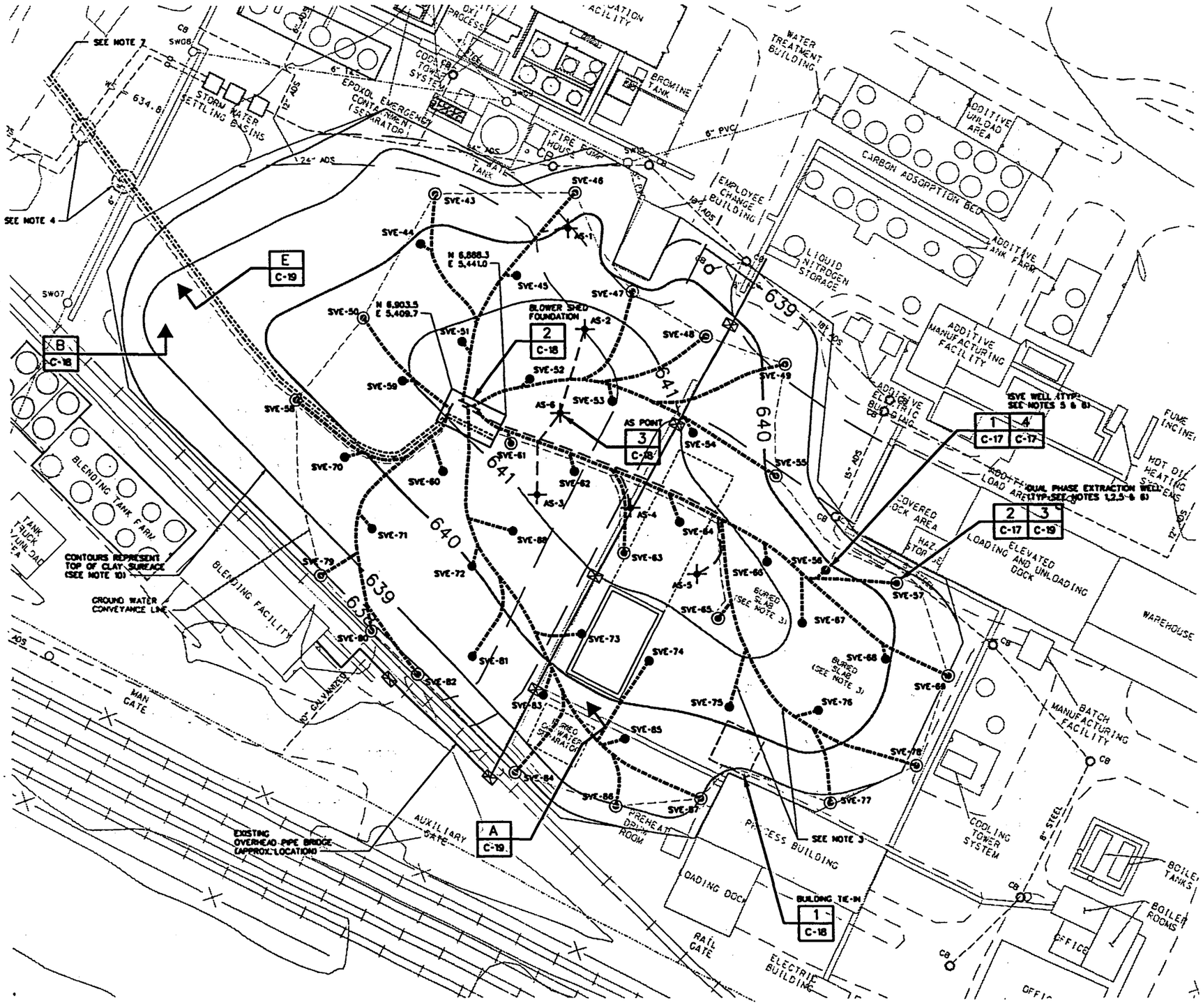

LEGEND:

- —640— CLAY CONTOUR ELEVATION
- VAPOR EXTRACTION LATERAL PIPE ALIGNMENT
- AIR SPARGE SUPPLY PIPE ALIGNMENT
- ISVE VAPOR EFFLUENT CONVEYANCE PIPE LOCATION
- GROUND WATER CONVEYANCE PIPE FROM DUAL EXTRACTION WELLS
- CONDENSATE CONVEYANCE PIPE
- STORM SEWER LINE
- SANITARY SEWER LINE
- SVE-54 ISVE WELL LOCATION
- SVE-55 DUAL PHASE WELL LOCATION
- AS-1 AIR SPARGE POINT
- PROPOSED ROADWAY THROUGH WELL FIELD
- CB CATCH BASIN
- SEWER WATER MANWAY

NOTES:

1. PERIMETER WELLS AND THREE INTERIOR WELLS ARE DUAL EXTRACTION WELLS. SEE SHEET C-20.
2. ISVE WELL DEPTHS AS NOTED ON SHEET C-20.
3. BURIED 12-INCH THICK REINFORCED CONCRETE FOUNDATIONS. CUT OR CORE THROUGH FOUNDATIONS AS NEEDED. BURIED PIPE TO BE INSTALLED ABOVE FOUNDATIONS.
4. ISVE/GROUNDWATER CONVEYANCE LINES TO BE RUN UNDER EXISTING UTILITIES.
5. ISVE WELL LOCATION COORDINATES SHOWN ON SHEET C-20. ACTUAL PIPE LAYOUT AND WELL LOCATIONS TO BE FIELD MODIFIED AS NECESSARY.
6. PLACE DRILL CUTTINGS AND TRENCH SPOILS IN DESIGNATED AREA OF OFF-SITE CONTAINMENT AREA UNDER ENGINEERED COVER. SEE SHEET C-4.
7. RUN ISVE AND CONDENSATE CONVEYANCE PIPE IN SAME TRENCH AS GROUNDWATER CONVEYANCE PIPE.
8. CLAY SURFACE TO BE REPAIRED AND RECOMPACTED FOLLOWING PIPE AND WELL INSTALLATION.
9. ACTUAL WELL AND PIPE LOCATIONS TO BE SURVEYED PRIOR TO TRENCH BACKFILL.
10. CLAY SURFACE TO BE REPAIRED AND RECOMPACTED FOLLOWING PIPE AND WELL INSTALLATION.

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File: J:\1252\042\28\drawings\chr\acswa02.dgn

REV	DATE	BY	DESCRIPTION

SCALE 1"=30'-0"

WARNING 0 ½ 1 IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

DESIGNED ____ DRAWN RBA CHECKED ____

SUBMITTED BY
TOM BLAIR (PROJECT MANAGER) IN-19600482 LICENSE NO. ____ DATE
(COMPANY OFFICER) ____ LICENSE NO. ____ DATE

MONTGOMERY WATSON
Chicago, Illinois

ACS RD/RA GROUP
AMERICAN CHEMICAL SERVICE SUPERFUND SITE
GRIFFITH, INDIANA

95% REMEDIAL DESIGN

STILL BOTTOMS POND AREA
ISVE PLAN VIEW AND YARD PIPING

SHEET 3